General

Guideline Title

Final recommendation statement: obstructive sleep apnea in adults: screening.

Bibliographic Source(s)

Final recommendation statement: obstructive sleep apnea in adults: screening. [internet]. Rockville (MD): U.S. Preventive Services Task Force (USPSTF); 2017 Jan [7 p]. [23 references]

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

The U.S. Preventive Services Task Force (USPSTF) grades its recommendations (A, B, C, D, or I) and identifies the Levels of Certainty regarding Net Benefit (High, Moderate, and Low). The definitions of these grades can be found at the end of the "Major Recommendations" field.

Summary of Recommendation and Evidence

The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for obstructive sleep apnea (OSA) in asymptomatic adults (I statement).

See the "Clinical Considerations" section below for suggestions for practice regarding the I statement.

Clinical Considerations

Patient Population Under Consideration

This recommendation applies to asymptomatic adults (18 years and older). It also applies to adults with unrecognized symptoms of OSA (see Figure 2 in the original guideline document). This includes persons who are not aware of their symptoms or do not report symptoms as being a concern to their clinician. This recommendation does not apply to persons presenting with symptoms (e.g., snoring, witnessed apnea, excessive daytime sleepiness, impaired cognition, mood changes, or gasping or choking at night) or concerns about OSA, persons who have been referred for evaluation or treatment of suspected OSA, or persons who have acute conditions that could trigger the onset of OSA (e.g., stroke). Care of these

persons should be managed as clinically appropriate. This recommendation also does not apply to children, adolescents, or pregnant women.

Suggestions for Practice Regarding the I Statement

Potential Preventable Burden

Based on data from the 1990s, the estimated prevalence of OSA in the United States is 10% for mild OSA and 3.8% to 6.5% for moderate to severe OSA. Current prevalence may be higher, given the increasing prevalence of obesity. Extrapolation from long-term follow-up data from the Wisconsin Sleep Cohort Study (1988-1994 to 2007-2010) results in an estimated prevalence of 16% for mild OSA and 10% for moderate to severe OSA. The prevalence of severe OSA in asymptomatic persons is unknown. In the Wisconsin Sleep Cohort Study, approximately 6% of adults with no or mild OSA progressed to moderate to severe OSA over 4 years.

Risk factors associated with OSA include male sex, older age (40 to 70 years), postmenopausal status, higher body mass index (BMI), and craniofacial and upper airway abnormalities. The evidence on other risk factors, such as smoking, alcohol and sedative use, and nasal congestion, is sparse or mixed.

Observational studies have reported an association between severe OSA and mortality risk. In theory, screening for OSA could improve mortality by identifying OSA early and providing treatment before it can adversely influence mortality. Although studies generally show that treatment of OSA with continuous positive airway pressure (CPAP) and mandibular advancement devices (MADs) improves intermediate outcomes, such as the apnea-hypopnea index (AHI), Epworth Sleepiness Scale (ESS) score, there is a lack of studies demonstrating that change in AHI or ESS score improves health outcomes, and no well-controlled trials have demonstrated an improvement in mortality with treatment of OSA.

In trials reviewed by the USPSTF, treatment with CPAP effectively reduced AHI to normal (<5) or near-normal (<10) levels. Treatment with MADs showed more modest improvements in AHI. Treatment with either CPAP or MADs improved ESS scores by approximately 2 points, and trials evaluating treatment with CPAP also found reductions in blood pressure. However, the clinical significance of these small reductions is unclear. Of note, trials that evaluated treatment with CPAP or MADs were primarily conducted in referred or sleep clinic patients, not screen-detected patients from primary care settings.

Potential Harms

Direct evidence on the harms of screening for OSA is lacking. Commonly reported harms of treatment with CPAP include oral or nasal dryness, eye or skin irritation, rash, epistaxis, and pain. An estimated 14% to 32% of patients discontinue treatment with CPAP over 4 years. Commonly reported harms of treatment with MADs include oral mucosal, dental, or jaw symptoms, such as mucosal or dental pain, discomfort or tenderness, mucosal erosions, and jaw or temporomandibular joint pain or discomfort. Less common harms include oral dryness and excess salivation. Limited study data suggest that 7% of patients discontinue treatment with MADs because of harms.

Current Practice

Most primary care clinicians do not routinely screen for OSA. According to a practice-based research network study of 44 practices, only 20% of patients with sleep-related symptoms who regularly visit a primary care clinician spontaneously reported their symptoms to their clinician. Some potential barriers to screening cited by clinicians include being unsure about how to identify and diagnose OSA, uncertainty regarding which type of sleep monitors are best for the diagnosis of OSA, and how to follow up patients who have been diagnosed with OSA.

Screening Tests

Potential screening questionnaires and clinical prediction tools include the ESS, STOP Questionnaire (Snoring, Tiredness, Observed Apnea, High Blood Pressure), STOP-Bang Questionnaire (STOP Questionnaire plus BMI, Age, Neck Circumference, and Gender), Berlin Questionnaire, Wisconsin Sleep Questionnaire, and the Multivariable Apnea Prediction (MVAP) tool. However, none of these instruments

have been adequately validated in a primary care setting.

Definitions

What the U.S. Preventive Services Task Force (USPSTF) Grades Mean and Suggestions for Practice

Grade	Definition	Suggestions for Practice
A	The USPSTF recommends the service. There is high certainty that the net benefit is substantial.	Offer or provide this service.
B	The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial.	Offer or provide this service.
C	The USPSTF recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.	Offer or provide this service for selected patients depending on individual circumstances.
D	The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits.	Discourage the use of this service.
I Statement	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality or conflicting, and the balance of benefits and harms cannot be determined.	Read the "Clinical Considerations" section of the USPSTF Recommendation Statement (see the "Major Recommendations" field). If the service is offered, patients should understand the uncertainty about the balance of benefits and harms.

USPSTF Levels of Certainty Regarding Net Benefit

Definition: The USPSTF defines certainty as "likelihood that the USPSTF assessment of the net benefit of a preventive service is correct." The net benefit is defined as benefit minus harm of the preventive service as implemented in a general, primary care population. The USPSTF assigns a certainty level based on the nature of the overall evidence available to assess the net benefit of a preventive service.

Level of Certainty	Description
High	The available evidence usually includes consistent results from well-designed, well-conducted studies in representative primary care populations. These studies assess the effects of the preventive service on health outcomes. This conclusion is therefore unlikely to be strongly affected by the results of future studies.
Moderate	The available evidence is sufficient to determine the effects of the preventive service on health outcomes, but confidence in the estimate is constrained by factors such as: The number, size, or quality of individual studies Inconsistency of findings across individual studies Limited generalizability of findings to routine primary care practice Lack of coherence in the chain of evidence As more information becomes available, the magnitude or direction of the observed effect could change, and this change may be large enough to alter the conclusion.
Low	The available evidence is insufficient to assess effects on health outcomes. Evidence is insufficient because of: The limited number or size of studies Important flaws in study design or methods Inconsistency of findings across individual studies Gaps in the chain of evidence Findings not generalizable to routine primary care practice

Level of Certainty	Description
	A lack of information on important health outcomes More information may allow an estimation of effects on health outcomes.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Obstructive sleep apnea

Guideline Category

Screening

Treatment

Clinical Specialty

Family Practice

Internal Medicine

Nursing

Otolaryngology

Sleep Medicine

Intended Users

Advanced Practice Nurses

Nurses

Physician Assistants

Physicians

Respiratory Care Practitioners

Guideline Objective(s)

To issue a new U.S. Preventive Services Task Force (USPSTF) recommendation on screening for obstructive sleep apnea (OSA) in asymptomatic adults

Target Population

Asymptomatic adults (18 years and older) and those with unrecognized symptoms of OSA, including persons who are not aware of their symptoms or do not report symptoms as being a concern to their

clinician

Note: This recommendation does not apply to persons presenting with symptoms (e.g., snoring, witnessed apnea, excessive daytime sleepiness, impaired cognition, mood changes, or gasping or choking at night) or concerns about OSA, persons who have been referred for evaluation or treatment of suspected OSA, or persons who have acute conditions that could trigger the onset of OSA (e.g., stroke).

Interventions and Practices Considered

Screening for obstructive sleep apnea

Major Outcomes Considered

- Key Question 1
  a. Does screening for obstructive sleep apnea (OSA) in adults improve health outcomes?
  b. Does the evidence on screening for OSA in adults differ for subgroups defined by age, sex, body mass index (BMI), or OSA severity?
- Key Question 2
  a. What is the accuracy of currently existing clinical prediction tools or screening questionnaires in identifying persons in the general population who are more or less likely to have OSA?
  b. What is the accuracy of multistep screening approaches, such as using a questionnaire or prediction tool followed by overnight home-based testing, in identifying persons in the general population who are more or less likely to have OSA?
- Key Question 3
  a. What is the accuracy and reliability of diagnostic tests for OSA?
  b. Do the accuracy and reliability of diagnostic tests for OSA differ for subgroups defined by age, sex, or BMI?
- Key Question 4
  a. How much does treatment with continuous positive airway pressure (CPAP), mandibular advancement devices, surgery, or weight loss programs improve intermediate outcomes (i.e., the apnea-hypopnea index [AHI], blood pressure, or sleepiness) in persons with OSA?
  b. Do the benefits of treatment (for intermediate outcomes) differ for subgroups defined by age, sex, BMI, or OSA severity?
- Key Question 5
  a. Does treatment with CPAP, mandibular advancement devices, surgery, or weight loss programs improve health outcomes in persons with OSA?
  b. Do the benefits of treatment (for health outcomes) differ for subgroups defined by age, sex, BMI, or OSA severity?
- Key Question 6: Is there an association between AHI and health outcomes?
- Key Question 7
  a. Are there harms associated with screening or diagnostic testing for OSA?
  b. Do the harms of screening or diagnostic testing differ for subgroups defined by age, sex, or BMI?
- Key Question 8
  a. Are there harms associated with treatment of OSA?
  b. Do the harms of treatment differ for subgroups defined by age, sex, BMI, or OSA severity?

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Searches of Unpublished Data

Description of Methods Used to Collect/Select the Evidence

Note from the National Guideline Clearinghouse (NGC): A systematic evidence review was prepared by the RTI International–University of North Carolina at Chapel Hill Evidence-based Practice Center (EPC) for the U.S. Preventive Services Task Force (USPSTF) (see the "Availability of Companion Documents" field).

Data Sources and Searches

The investigators searched PubMed/MEDLINE, the Cochrane Library, and EMBASE for English-language articles published through October 2015. ClinicalTrials.gov and the World Health Organization International Clinical Trials Registry Platform were also searched for unpublished literature. The search strategies for PubMed and Cochrane databases are detailed in the eMethods in the systematic review supplement. To supplement electronic searches, the reference lists of pertinent articles were reviewed, as well as all studies suggested by reviewers or comments received during public commenting periods. Since October 2015, the investigators conducted ongoing surveillance through article alerts and targeted searches of high-impact journals to identify major studies published in the interim that may affect the conclusions or understanding of the evidence and therefore the related USPSTF recommendation. The last surveillance was conducted on October 5, 2016.

Study Selection

Two investigators independently reviewed titles, abstracts, and full-text articles to determine eligibility using prespecified criteria for each key question (KQ) (see eTable 1 in the systematic review supplement). Disagreements were resolved by discussion. The review included English-language studies of adults conducted in countries categorized as "very high" on the Human Development Index. Only studies rated as good or fair quality using predefined criteria and definitions developed by the USPSTF and adapted for this topic (see eTable 2 in the systematic review supplement) were included. The review excluded studies of people with acute conditions (e.g., stroke) that can trigger onset of obstructive sleep apnea (OSA) and studies focused on screening, diagnosis, or treatment of OSA among persons with rare conditions (e.g., acromegaly) for whom testing for OSA would be considered part of management for their disease.

For the overarching question regarding direct evidence that screening improves health outcomes (KQ1) and the question on accuracy of clinical prediction tools or screening questionnaires (KQ2), studies were required to enroll asymptomatic adults or persons with unrecognized symptoms of OSA; referral populations were not eligible. For KQ1, randomized clinical trials (RCTs) comparing screened with nonscreened groups were eligible. For KQ2, studies that evaluated screening questionnaires or clinical prediction tools (alone or followed by home-based portable monitoring) compared with overnight polysomnography conducted in a sleep laboratory were eligible. Studies of people referred to sleep laboratories because of concern for OSA were excluded, and studies in which only a subgroup (usually the highest-risk group) underwent polysomnography were excluded because of concern for verification bias. Clinical prediction tools were required to include multiple factors.

For diagnostic test accuracy (KQ3) and harms associated with screening and diagnostic tests (KQ7), referral populations were also eligible (in addition to the populations eligible for KQ1 and KQ2). For KQ3, good-quality, recent systematic reviews comparing portable monitors (Table 2 in the systematic review describes the types of monitors) with polysomnography conducted in a sleep laboratory were eligible. Multiple good-quality, recent, and relevant systematic reviews for KQ3 were identified; primary studies published after the search cutoffs of the most recent systematic reviews were also included. For KQ7, studies eligible for KQ1, KQ2, or KQ3 that reported false-positive results leading to unnecessary treatment, anxiety, condition-specific distress, or stigma were eligible.

For benefits and harms of treatment (KQ4, KQ5, and KQ8), RCTs enrolling people with a confirmed

diagnosis of OSA were eligible; studies could include asymptomatic adults, symptomatic adults, or both. Studies evaluating continuous positive airway pressure (CPAP), mandibular advancement devices (MADs), surgery, and weight loss programs were included; other treatments were not eligible (e.g., oropharyngeal exercises). For KQ8, prospective cohort studies with at least 100 participants that reported harms of surgical interventions were also eligible.

For the association between apnea-hypopnea index (AHI) and health outcomes (KQ6), prospective cohort studies that followed up participants for at least 1 year were included. Studies were excluded that focused primarily on central sleep apnea, enrolled patients hospitalized for acute events, enrolled patients in a periprocedural period, or did not address potential confounding.

Number of Source Documents

See the literature flow diagram (Figure 2) in the systematic review (see the "Availability of Companion Documents" field) for a summary of evidence search and selection.

Articles included for Key Questions:

- Key Question 1: 0 studies
- Key Question 2: 3 studies (3 articles)
- Key Question 3: 21 studies (22 articles)
- Key Question 4: 76 studies (88 articles)
- Key Question 5: 50 studies (58 articles)
- Key Question 6: 11 studies (12 articles)
- Key Question 7: 0 studies
- Key Question 8: 22 studies (26 articles)

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Using predefined criteria and definitions developed by the U.S. Preventive Services Task Force (USPSTF) and adapted for this topic (see eTable 2 in the systematic review supplement [see the "Availability of Companion Documents" field]), two independent investigators assessed the quality of studies as good, fair, or poor. Disagreements were resolved by discussion.

Methods Used to Analyze the Evidence

Meta-Analysis

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Note from the National Guideline Clearinghouse (NGC): A systematic evidence review was prepared by the RTI International–University of North Carolina at Chapel Hill Evidence-based Practice Center (EPC) for the U.S. Preventive Services Task Force (USPSTF) (see the "Availability of Companion Documents" field).

Data Extraction and Quality Assessment

For each included study, one investigator extracted information about the populations, tests or treatments, comparators, outcomes, settings, and designs, and a second investigator reviewed for completeness and accuracy. Two independent investigators assessed the quality of studies as good, fair, or poor. Disagreements were resolved by discussion.

Data Synthesis and Analysis

Findings for each question were summarized in tabular and narrative form. To determine whether meta-analyses were appropriate, the clinical and methodological heterogeneity of the studies was assessed following established guidance. When multiple similar studies were available, quantitative synthesis was conducted with random-effects models using the inverse-variance weighted method (DerSimonian and Laird) to estimate pooled effects. For all quantitative syntheses, the I^2 statistic was calculated to assess statistical heterogeneity in effects between studies. Quantitative analyses were conducted using Comprehensive Meta-Analysis version 3.3 (Biostat Inc) and Stata version 14 (StataCorp). Statistical significance was assumed when 95% confidence intervals (CIs) of pooled results did not cross the null (i.e., 0 or 1, depending on the effect measure). All testing was 2-sided. This review covered a wide range of outcome measures and instruments; key measures and questionnaires are summarized in eTable 3 in the systematic review supplement (see the "Availability of Companion Documents" field).

For Key Question (KQ) 4 and KQ5 the weighted mean difference (WMD) between intervention and control was calculated for continuous outcomes; when multiple scales were combined in a single meta-analysis (for sleep-related quality of life), the investigators used the standardized mean difference, Cohen d. For Cohen d, a value of 0.20 is often interpreted as a small effect size, 0.50 as a medium effect size, and 0.80 as a large effect size. For meta-analyses of continuous positive airway pressure (CPAP) and mandibular advancement device (MAD) treatments, pooled estimates were calculated separately for studies using sham controls and those using other controls. Parallel trials and crossover trials were combined, but subgroup analyses were conducted to explore whether findings differed by this design feature.

For KQ6, the investigators conducted meta-analyses of adjusted hazard ratios (HRs) and 95% CIs for all-cause mortality. The HRs were converted to a log scale, and standard errors of the log HRs were calculated to normalize distributions and stabilize variances. The *metan* command with the *eform* command in Stata was then used to estimate pooled HRs. Analyses were by apnea-hypopnea index (AHI) thresholds corresponding to obstructive sleep apnea (OSA) severity categories.

Methods Used to Formulate the Recommendations

Balance Sheets

Expert Consensus

Description of Methods Used to Formulate the Recommendations

The U.S. Preventive Services Task Force (USPSTF) systematically reviews the evidence concerning both the benefits and harms of widespread implementation of a preventive service. It then assesses the certainty of the evidence and the magnitude of the benefits and harms. On the basis of this assessment, the USPSTF assigns a letter grade to each preventive service signifying its recommendation about provision of the service (see table below). An important, but often challenging, step is determining the balance between benefits and harms to estimate "net benefit" (that is, benefits minus harms).

U.S. Preventive Services Task Force Recommendation Grid*

Certainty of Net Benefit	Magnitude of Net Benefit			
	Substantial	Moderate	Small	Zero/Negative
High	A	B	C	D

Certainty of Net Benefit	Magnitude of Net Benefit			
	Substantial	**Moderate**	**Small**	**Zero/Negative**
Moderate	B	B	C	D
Low	Insufficient			

**A*, *B*, *C*, *D*, and *I (Insufficient)* represent the letter grades of recommendation or statement of insufficient evidence assigned by the USPSTF after assessing certainty and magnitude of net benefit of the service (see the "Rating Scheme for the Strength of the Recommendations" field).

The overarching question that the USPSTF seeks to answer for every preventive service is whether evidence suggests that provision of the service would improve health outcomes if implemented in a general primary care population. For screening topics, this standard could be met by a large randomized controlled trial (RCT) in a representative asymptomatic population with follow-up of all members of both the group "invited for screening" and the group "not invited for screening."

Direct RCT evidence about screening is often unavailable, so the USPSTF considers indirect evidence. To guide its selection of indirect evidence, the Task Force constructs a "chain of evidence" within an analytic framework. For each key question, the body of pertinent literature is critically appraised, focusing on the following 6 questions:

> Do the studies have the appropriate research design to answer the key question(s)?
> To what extent are the existing studies of high quality? (i.e., what is the internal validity?)
> To what extent are the results of the studies generalizable to the general U.S. primary care population and situation? (i.e., what is the external validity?)
> How many studies have been conducted that address the key question(s)? How large are the studies? (i.e., what is the precision of the evidence?)
> How consistent are the results of the studies?
> Are there additional factors that assist the USPSTF in drawing conclusions (e.g., presence or absence of dose–response effects, fit within a biologic model)?

The next step in the USPSTF process is to use the evidence from the key questions to assess whether there would be net benefit if the service were implemented. In 2001, the USPSTF published an article that documented its systematic processes of evidence evaluation and recommendation development. At that time, the USPSTF's overall assessment of evidence was described as good, fair, or poor. The USPSTF realized that this rating seemed to apply only to how well studies were conducted and did not fully capture all of the issues that go into an overall assessment of the evidence about net benefit. To avoid confusion, the USPSTF has changed its terminology. Whereas individual study quality will continue to be characterized as good, fair, or poor, the term *certainty* will now be used to describe the USPSTF's assessment of the overall body of evidence about net benefit of a preventive service and the likelihood that the assessment is correct. Certainty will be determined by considering all 6 questions listed above; the judgment about certainty will be described as high, moderate, or low.

In making its assessment of certainty about net benefit, the evaluation of the evidence from each key question plays a primary role. It is important to note that the USPSTF makes recommendations for real-world medical practice in the United States and must determine to what extent the evidence for each key question—even evidence from screening RCTs or treatment RCTs—can be applied to the general primary care population. Frequently, studies are conducted in highly selected populations under special conditions. The USPSTF must consider differences between the general primary care population and the populations studied in RCTs and make judgments about the likelihood of observing the same effect in actual practice.

It is also important to note that one of the key questions in the analytic framework refers to the potential harms of the preventive service. The USPSTF considers the evidence about the benefits and harms of preventive services separately and equally. Data about harms are often obtained from observational studies because harms observed in RCTs may not be representative of those found in usual practice and because some harms are not completely measured and reported in RCTs.

Putting the body of evidence for all key questions together as a chain, the USPSTF assesses the certainty

of net benefit of a preventive service by asking the 6 major questions listed above. The USPSTF would rate a body of convincing evidence about the benefits of a service that, for example, derives from several RCTs of screening in which the estimate of benefits can be generalized to the general primary care population as "high" certainty (see the "Rating Scheme for the Strength of Recommendations" field). The USPSTF would rate a body of evidence that was not clearly applicable to general practice or has other defects in quality, research design, or consistency of studies as "moderate" certainty. Certainty is "low" when, for example, there are gaps in the evidence linking parts of the analytic framework, when evidence to determine the harms of treatment is unavailable, or when evidence about the benefits of treatment is insufficient. Table 4 in the methodology document listed below (see the "Availability of Companion Documents" field) summarizes the current terminology used by the USPSTF to describe the critical assessment of evidence at all 3 levels: individual studies, key questions, and overall certainty of net benefit of the preventive service.

Sawaya GF, Guirguis-Blake J, LeFevre M, Harris R, Petitti D; U.S. Preventive Services Task Force. Update on the methods of the U.S. Preventive Services Task Force: estimating certainty and magnitude of net benefit. Ann Intern Med. 2007;147:871-875. [5 references].

I Statements

For I statements, the USPSTF has a new plan to commission its Evidence-based Practice Centers to collect information in 4 domains pertinent to clinical decisions about prevention and to report this information routinely. This plan is described in the paper: Petitti DB et al. Update on the methods of the U.S. Preventive Services Task Force: insufficient evidence. Ann Intern Med. 2009;150:199-205. www.annals.org .

The first domain is potential preventable burden of suffering from the condition. When evidence is insufficient, provision of an intervention designed to prevent a serious condition (such as dementia) might be viewed more favorably than provision of a service designed to prevent a condition that does not cause as much suffering (such as rash). The USPSTF recognized that "burden of suffering" is subjective and involves judgment. In clinical settings, it should be informed by patient values and concerns.

The second domain is potential harm of the intervention. When evidence is insufficient, an intervention with a large potential for harm (such as major surgery) might be viewed less favorably than an intervention with a small potential for harm (such as advice to watch less television). The USPSTF again acknowledges the subjective nature and the difficulty of assessing potential harms: for example, how bad is a "mild" stroke?

The third domain is cost—not just monetary cost, but opportunity cost, in particular the amount of time a provider spends to provide the service, the amount of time the patient spends to partake of it, and the benefits that might derive from alternative uses of the time or money for patients, clinicians, or systems. Consideration of clinician time is especially important for preventive services with only insufficient evidence because providing them could "crowd out" provision of preventive services with proven value, services for conditions that require immediate action, or services more desired by the patient. For example, a decision to routinely inspect the skin could take up the time available to discuss smoking cessation, or to address an acute problem or a minor injury that the patient considers important.

The fourth domain is current practice. This domain was chosen because it is important to clinicians for at least 2 reasons. Clinicians justifiably fear that not doing something that is done on a widespread basis in the community may lead to litigation. More important, addressing patient expectations is a crucial part of the clinician–patient relationship in terms of building trust and developing a collaborative therapeutic relationship. The consequences of not providing a service that is neither widely available nor widely used are less serious than not providing a service accepted by the medical profession and thus expected by patients. Furthermore, ingrained care practices are difficult to change, and efforts should preferentially be directed to changing those practices for which the evidence to support change is compelling.

Although the reviewers did not explicitly recognize it when these domains were chosen, the domains all involve consideration of the potential consequences—for patients, clinicians, and systems—of providing or

not providing a service. Others writing about medical decision making in the face of uncertainty have suggested that the consequences of action or inaction should play a prominent role in decisions.

Rating Scheme for the Strength of the Recommendations

What the U.S. Preventive Services Task Force (USPSTF) Grades Mean and Suggestions for Practice

Grade	Definition	Suggestions for Practice
A	The USPSTF recommends the service. There is high certainty that the net benefit is substantial.	Offer or provide this service.
B	The USPSTF recommends the service. There is high certainty that the net benefit is moderate, or there is moderate certainty that the net benefit is moderate to substantial.	Offer or provide this service.
C	The USPSTF recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.	Offer or provide this service for selected patients depending on individual circumstances.
D	The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits.	Discourage the use of this service.
I Statement	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality or conflicting, and the balance of benefits and harms cannot be determined.	Read the "Clinical Considerations" section of the USPSTF Recommendation Statement (see the "Major Recommendations" field). If the service is offered, patients should understand the uncertainty about the balance of benefits and harms.

USPSTF Levels of Certainty Regarding Net Benefit

Definition: The USPSTF defines certainty as "likelihood that the USPSTF assessment of the net benefit of a preventive service is correct." The net benefit is defined as benefit minus harm of the preventive service as implemented in a general, primary care population. The USPSTF assigns a certainty level based on the nature of the overall evidence available to assess the net benefit of a preventive service.

Level of Certainty	Description
High	The available evidence usually includes consistent results from well-designed, well-conducted studies in representative primary care populations. These studies assess the effects of the preventive service on health outcomes. This conclusion is therefore unlikely to be strongly affected by the results of future studies.
Moderate	The available evidence is sufficient to determine the effects of the preventive service on health outcomes, but confidence in the estimate is constrained by factors such as: The number, size, or quality of individual studies Inconsistency of findings across individual studies Limited generalizability of findings to routine primary care practice Lack of coherence in the chain of evidence As more information becomes available, the magnitude or direction of the observed effect could change, and this change may be large enough to alter the conclusion.
Low	The available evidence is insufficient to assess effects on health outcomes. Evidence is insufficient because of: The limited number or size of studies Important flaws in study design or methods

Level of Certainty	Description
	Inconsistency of findings across individual studies Gaps in the chain of evidence Findings not generalizable to routine primary care practice A lack of information on important health outcomes More information may allow an estimation of effects on health outcomes.

Cost Analysis

The U.S. Preventive Services Task Force (USPSTF) does not consider the costs of providing a service in this assessment.

Method of Guideline Validation

Comparison with Guidelines from Other Groups

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

Peer Review

Before the U.S. Preventive Services Task Force (USPSTF) makes its final determinations about recommendations on a given preventive service, the Evidence-based Practice Center (EPC) and the Agency for Healthcare Research and Quality (AHRQ) send the draft evidence review to 4 to 6 external experts and to Federal agencies and professional and disease-based health organizations with interests in the topic. The experts are asked to examine the review critically for accuracy and completeness and to respond to a series of specific questions about the document. The draft evidence review is also posted on the USPSTF Web site for public comment. After assembling these external review comments and documenting the proposed response to key comments, the topic team presents this information to the USPSTF in memo form. In this way, the USPSTF can consider these external comments before it votes on its recommendations about the service. Draft recommendation statements are then circulated for comment among reviewers representing professional societies, voluntary organizations, and Federal agencies, as well as posted on the USPSTF Web site for public comment. These comments are discussed before the final recommendations are confirmed.

Response to Public Comment

A draft version of this recommendation statement was posted for public comment on the USPSTF Web site from June 14 to July 11, 2016. Some comments expressed concern that the definition of "asymptomatic" is unclear, did not agree that an asymptomatic population is the same as persons with unrecognized symptoms, or expressed concern that many symptomatic patients do not report symptoms to their health care professional. The USPSTF discussed its definitional approach extensively when creating the research plan. In the research plan, the USPSTF established that persons without symptoms or with unrecognized symptoms are the population of interest in which to identify potentially unrecognized obstructive sleep apnea (OSA). In response to comments, the USPSTF described common symptoms of OSA and defined what is meant by persons with unrecognized symptoms. Other comments suggested that a number of key studies were omitted that link OSA treatment to improved health outcomes. The USPSTF examined these studies and found they were either already included in the review, did not meet eligibility criteria for inclusion in the review, or were otherwise outside the scope of the review. A few comments suggested that persons who work in safety-sensitive transportation occupations (e.g., truck drivers or rail operators) have unique testing needs. Clinicians seeking information on testing persons who work in these occupations can consult the appropriate agency's guidelines. The U.S.

Department of Transportation recently sought public input related to the evaluation of moderate to severe OSA among persons with these occupations.

Comparison with Guidelines from Other Groups

Recommendations for screening from the following groups were discussed: the American Academy of Family Physicians, the American College of Physicians, the American Academy of Sleep Medicine, and the National Institute for Health and Care Excellence.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of evidence supporting the recommendations is not specifically stated.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Benefits of Early Detection and Intervention or Treatment

The U.S. Preventive Services Task Force (USPSTF) found inadequate direct evidence on the benefit of screening for obstructive sleep apnea (OSA) in asymptomatic populations. The USPSTF found no studies that evaluated the effect of screening for OSA on health outcomes. The USPSTF found at least adequate evidence that treatment with continuous positive airway pressure (CPAP) and mandibular advancement devices (MADs) can improve intermediate outcomes (e.g., the apnea-hypopnea index [AHI], Epworth Sleepiness Scale [ESS] score, and blood pressure) in populations referred for treatment. However, the applicability of this evidence to screen detected populations is limited. The adequacy of the evidence varies based on the type of intervention and the reported intermediate outcomes. The USPSTF found inadequate evidence on the link between change in the intermediate outcome (e.g., AHI) and reduction in the health outcome (e.g., mortality). The USPSTF found evidence that treatment with CPAP can improve general and sleep-related quality of life in populations referred for treatment, but the applicability of this evidence to screen-detected populations is unknown. The USPSTF found inadequate evidence on whether treatment with CPAP or MADs improves other health outcomes (mortality, cognitive impairment, motor vehicle crashes, and cardiovascular or cerebrovascular events). The USPSTF also found inadequate evidence on the effect of treatment with various surgical procedures in improving intermediate or health outcomes.

Potential Harms

Harms of Early Detection and Intervention or Treatment

The U.S. Preventive Services Task Force (USPSTF) found inadequate evidence on the direct harms of screening for obstructive sleep apnea (OSA). The USPSTF found adequate evidence that the harms of treatment of OSA with continuous positive airway pressure (CPAP) and mandibular advancement devices (MADs) are small. Reported harms include oral or nasal dryness; eye or skin irritation; rash; epistaxis; pain; excess salivation; and oral mucosal, dental, and jaw symptoms. The USPSTF found inadequate evidence on the harms of surgical treatment of OSA.

Qualifying Statements

Qualifying Statements

- The U.S. Preventive Services Task Force (USPSTF) makes recommendations about the effectiveness of specific preventive care services for patients without obvious related signs or symptoms.
- It bases its recommendations on the evidence of both the benefits and harms of the service and an assessment of the balance. The USPSTF does not consider the costs of providing a service in this assessment.
- The USPSTF recognizes that clinical decisions involve more considerations than evidence alone. Clinicians should understand the evidence but individualize decision making to the specific patient or situation. Similarly, the USPSTF notes that policy and coverage decisions involve considerations in addition to the evidence of clinical benefits and harms.
- Recommendations made by the USPSTF are independent of the U.S. government. They should not be construed as an official position of the Agency for Healthcare Research and Quality (AHRQ) or the U.S. Department of Health and Human Services.

Implementation of the Guideline

Description of Implementation Strategy

The experiences of the first and second U.S. Preventive Services Task Force (USPSTF), as well as that of other evidence-based guideline efforts, have highlighted the importance of identifying effective ways to implement clinical recommendations. Practice guidelines are relatively weak tools for changing clinical practice when used in isolation. To effect change, guidelines must be coupled with strategies to improve their acceptance and feasibility. Such strategies include enlisting the support of local opinion leaders, using reminder systems for clinicians and patients, adopting standing orders, and audit and feedback of information to clinicians about their compliance with recommended practice.

In the case of preventive services guidelines, implementation needs to go beyond traditional dissemination and promotion efforts to recognize the added patient and clinician barriers that affect preventive care. These include clinicians' ambivalence about whether preventive medicine is part of their job, the psychological and practical challenges that patients face in changing behaviors, lack of access to health care or of insurance coverage for preventive services for some patients, competing pressures within the context of shorter office visits, and the lack of organized systems in most practices to ensure the delivery of recommended preventive care.

Dissemination strategies have changed dramatically in this age of electronic information. While recognizing the continuing value of journals and other print formats for dissemination, the USPSTF will make all its products available through its Web site . The combination of electronic access and extensive material in the public domain should make it easier for a broad audience of users to access USPSTF materials and adapt them for their local needs. Online access to USPSTF products also opens up new possibilities for the appearance of the annual, pocket-size *Guide to Clinical Preventive Services*.

To be successful, approaches for implementing prevention have to be tailored to the local level and deal with the specific barriers at a given site, typically requiring the redesign of systems of care. Such a systems approach to prevention has had notable success in established staff-model health maintenance organizations, by addressing organization of care, emphasizing a philosophy of prevention, and altering the training and incentives for clinicians. Staff-model plans also benefit from integrated information systems that can track the use of needed services and generate automatic reminders aimed at patients and clinicians, some of the most consistently successful interventions. Information systems remain a

major challenge for individual clinicians' offices, however, as well as for looser affiliations of practices in network-model managed care and independent practice associations, where data on patient visits, referrals, and test results are not always centralized.

Implementation Tools

Mobile Device Resources

Patient Resources

Pocket Guide/Reference Cards

Staff Training/Competency Material

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Staying Healthy

IOM Domain

Effectiveness

Identifying Information and Availability

Bibliographic Source(s)

Final recommendation statement: obstructive sleep apnea in adults: screening. [internet]. Rockville (MD): U.S. Preventive Services Task Force (USPSTF); 2017 Jan [7 p]. [23 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2017 Jan

Guideline Developer(s)

U.S. Preventive Services Task Force - Independent Expert Panel

Guideline Developer Comment

The U.S. Preventive Services Task Force (USPSTF) is a federally-appointed panel of independent experts. Conclusions of the USPSTF do not necessarily reflect policy of the U.S. Department of Health and Human Services or its agencies.

Source(s) of Funding

The U.S. Preventive Services Task Force (USPSTF) is an independent, voluntary body. The U.S. Congress mandates that the Agency for Healthcare Research and Quality (AHRQ) support the operations of the USPSTF.

Guideline Committee

U.S. Preventive Services Task Force

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*Members of the Task Force at the time this recommendation was finalized. For a list of current Task Force members, go to https://www.uspreventiveservicestaskforce.org/Page/Name/our-members.

Financial Disclosures/Conflicts of Interest

The U.S. Preventive Services Task Force (USPSTF) has an explicit policy concerning conflict of interest. All members disclose at each meeting if they have a significant financial, professional/business, or intellectual conflict for each topic being discussed. USPSTF members with conflicts may be recused from discussing or voting on recommendations about the topic in question.

Disclosures

All authors have completed and submitted the International Committee of Medical Journal Editors (ICMJE) Form for Disclosure of Potential Conflicts of Interest. Authors followed the policy regarding conflicts of interest described at https://www.uspreventiveservicestaskforce.org/Page/Name/conflict-of-interest-disclosures. All members of the USPSTF receive travel reimbursement and an honorarium for participating in USPSTF meetings.

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Available from the U.S. Preventive Services Task Force (USPSTF) Web site .

Availability of Companion Documents

The following are available:

Evidence Reviews:

> Jonas DE, Amick HR, Feltner C, Weber RP, Arvantis M, Stine A, Lux L, Harris RP. Screening for obstructive sleep apnea in adults: evidence report and systematic review for the U.S. Preventive Services Task Force. JAMA. 2017 Jan 24;317(4):415-433.
> Jonas DE, Amick HR, Feltner C, Weber RP, Arvantis M, Stine A, Lux L, Middleton JC, Voisin C, Harris RP. Screening for obstructive sleep apnea in adults: an evidence review for the U.S. Preventive Services Task Force. Evidence Synthesis No. 146. Publication No. 14-05216-EF-1. Rockville (MD): Agency for Healthcare Research and Quality; 2017 Jan. 377 p.

Available from the U.S. Preventive Services Task Force (USPSTF) Web site .

Background Articles:

> Barton MB et al. How to read the new recommendation statement: methods update from the U.S. Preventive Services Task Force. Ann Intern Med. 2007;147:123-7.
> Guirguis-Blake J et al. Current processes of the U.S. Preventive Services Task Force: refining evidence-based recommendation development. Ann Intern Med. 2007;147:117-22.
> Sawaya GF et al. Update on the methods of the U.S. Preventive Services Task Force: estimating certainty and magnitude of net benefit. Ann Intern Med. 2007;147:871-5.
> Petitti DB et al. Update on the methods of the U.S. Preventive Services Task Force: insufficient evidence. Ann Intern Med. 2009;150:199-205.

Available from the USPSTF Web site .

The following are also available:

> Obstructive sleep apnea in adults: screening. Clinical summary. Rockville (MD): U.S. Preventive Services Task Force; 2017 Jan. 1 p. Available from the USPSTF Web site .

The Electronic Preventive Services Selector (ePSS) is an application designed to provide primary care clinicians and health care teams timely decision support regarding appropriate screening, counseling, and preventive services for their patients. It is based on the current, evidence-based recommendations of the USPSTF and can be searched by specific patient characteristics, such as age, sex, and selected behavioral risk factors.

Patient Resources

The following is available:

> Screening for obstructive sleep apnea in adults. JAMA patient page. JAMA. 2017 Jan 24;317(4):450.

Myhealthfinder is a new tool that provides personalized recommendations for clinical preventive services specific to the user's age, gender, and pregnancy status. It features evidence-based recommendations from the USPSTF and is available at www.healthfinder.gov .

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them

better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

This NGC summary was completed by ECRI Institute on March 23, 2017. The information was verified by the guideline developer on April 12, 2017.

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